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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,805	05/24/2000	Thomas T. Hansen	1063.004US1	4540

21186 7590 03/21/2002

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EXAMINER

JONES, JUDSON

ART UNIT PAPER NUMBER

2834

DATE MAILED: 03/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,805

Applicant(s)

HANSEN ET AL.

Examiner

Judson H. Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-14, 16-20, 22, 24, 25 and 27-74 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☒ Claim(s) 24, 25 and 27-74 is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 10, 12, 13, 19 and 29-31 is/are rejected.
- 7) ☒ Claim(s) 4-6, 8, 11, 14, 16-18, 20 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Applicant's arguments with respect to claims 1-31 and 73 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

Claims 1, 2 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paul et al. in view of Patzer. Paul et al. discloses a high power ultrasonic transducer as described in column 4 lines 1-25 but does not disclose how much power is provided. However, Patzer teaches connecting ultrasonic transducers together in column 4 lines 6-10 in order to perform more work in a given amount of time. Since Paul et al. and Patzer are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have added more transducers in the device of Paul et al. in order to hydrotreat heavy crude oil faster. According to Patzer column 2 lines 29-31, "The operation of magnetostrictive transducer elements requires a sufficiently strong power source and appropriate control arrangements." Adding more transducer elements would require more power for the transducer.

In regard to claim 2, see Paul et al. column 4 lines 5-9.

Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paul et al. in view of Patzer as applied to claim 2 above, and further in view of Owen. Paul et al. as modified by Patzer discloses the transducer but does not disclose magnetic means for biasing the active element because biasing the active element is not the inventive concept in that device. Magnetic biasing is well known in the art. Owen teaches magnetic biasing in column 7 lines 10-15. Since Owen and Paul et al. as modified by Patzer are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have utilized magnetic biasing in

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the device of Paul et al. as modified by Patzer in order to make the magnetostrictive device operate in a predictable and linear fashion.

Claims 7 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paul et al. as modified by Patzer and Owen as applied to claim 6 above, and further in view of Porzio et al. Paul et al. as modified by Patzer and Owen discloses the transducer but does not disclose flux return elements. However, Porzio et al. discloses flux return elements in column 5 lines 9-13 for the purpose of improving the efficiency of the device by reducing flux losses. Since Porzio et al. and Paul et al. as modified by Patzer and Owen are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have utilized flux return elements in the device of Paul et al. as modified by Patzer and Owen for the purpose of increasing the efficiency of the device.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paul et al. as modified by Patzer as applied to claim 1 above, and further in view of Wuchlinich. Paul et al. as modified by Patzer discloses the transducer but does not disclose making an acoustic element from an acoustic metal. However, Wuchinich teaches in column 4 line 65 to column 5 line 2 making an ultrasonically vibrating piece driven by a magnetostrictive actuator from an acoustic metal. While Wuchinich is a device for surgically removing body tissue, the problem of damping the vibrations of an ultrasonic device applies to magnetostrictive actuators for hydrotreating crude oil as well. Since Wuchinich and Paul et al. as modified by Patzer are both magnetostrictive ultrasonic vibrators, it would have been obvious for one of ordinary skill in the art to have utilized an acoustic element made from an acoustic metal in the device of Paul et al.

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as modified by Patzer in order to reduce damping and thus improve the performance of the device.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paul et al. as modified by Patzer and Wuchlinich as applied to claim 12 above, and further in view of Berger et al. Paul et al. as modified by Patzer and Wuchlinich discloses the transducer with an acoustic element made from an acoustic metal but does not disclose the acoustic metal being a magnesium alloy. However, Berger et al. teaches in column 3 lines 32-37 that aluminum, titanium and magnesium and their alloys have good acoustic conducting qualities. Since Berger et al. and Paul et al. as modified by Patzer and Wuchlinich are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have utilized a magnesium alloy for making an acoustic element in order to reduce the cost of the transducer assembly.

Allowable Subject Matter

Claims 4-6, 8, 11, 14, 16-18, 20, 22, 24, 25, 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 32-74 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach a tubular magnetic biasing means having a radial thickness in the central portion which is less than the radial thickness in the end portion as recited in claims 4 and 24. The prior art of record does not disclose or teach first and second flux return elements made of disk-elements having the specified resistivity and magnetic

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saturation flux density as recited in claims 8 in combination with the other elements in the claim. Porzio uses silicon steel for flux return elements. According to Huppi, "In recent years, core loss improvements have been made to grain oriented electrical steels which increased the volume resistivity from 47-49 micro-ohm -cm (.mu.-.OMEGA.-cm) to 50-51 micro-ohm -cm. This increase in volume resistivity was obtained by raising the silicon content of the steel from a level of 2.9-3.15 wt % to a level of 3.25-3.5 wt %." Jandeska et al. teaches using a nickel iron alloy for a flux return in column 7 line 7 to column 8 line 2. However, no teaching has been found for combining the flux return material of Jandeska et al. with the transducer device of Paul et al. as modified by Patzer, Owen and Porzio et al. The prior art of record does not disclose or teach an acoustic element mounted on a transducer made from a material having a quarter resonant wavelength with the acoustic element having a length equal to the quarter resonant wavelength, as recited in claim 11. The prior art of record does not disclose or teach a transducer having a passageway for cooling fluid formed from an electrically insulative material as recited in claims 14 and 20. The prior art of record does not disclose or teach a plurality of sub-motors, each containing a prestress bolt and designed to operate simultaneously with a refrigerator having a phase change cooling medium designed to cool each active element and a master wave guide as recited in claim 32.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hartman et al. discloses a magnetostrictive transducer having cooling passageways in the transducer or around the transducer in an epoxy matrix. According to Hartman et al. column 7 lines 43-46 the cooling passages can be made of copper tubing embedded in an epoxy matrix filled with aluminum. Hartman et al. also states, "The cooling assembly 112 may comprise any

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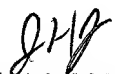
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conventional thermally conductive cooling arrangement." The Slaughter et al. reference used in the office action of 8/29/01 is not prior art because the filing date of Slaughter et al. is after the filing date of the parent application of this C.I.P.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ 
March 16, 2002


NESTOR RAMIREZ
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